

# UTAH DIVISION OF OIL, GAS AND MINING

REMARKS: WELL LOG \_\_\_\_\_ ELECTRIC LOGS \_\_\_\_\_ FILE X WATER SANDS \_\_\_\_\_ LOCATION INSPECTED \_\_\_\_\_ SUB. REPORT/ABD. \_\_\_\_\_

DATE FILED 8-6-79

LAND: FEE & PATENTED

STATE LEASE NO.

PUBLIC LEASE NO. U-9831

INDIAN

DRILLING APPROVED: 8-6-79

SPUDDED IN:

COMPLETED:

PUT TO PRODUCING:

INITIAL PRODUCTION:

GRAVITY A.P.I.

GOR:

PRODUCING ZONES:

TOTAL DEPTH:

WELL ELEVATION:

DATE ABANDONED: 3-10-80 LOCATION ABANDONED WELL NEVER DRILLED

FIELD: San Arroyo 3/86

UNIT:

COUNTY: Grand

WELL NO. Arco 6-1

API NO: 43-019-30532

LOCATION

1193'

FT. FROM (N) XX LINE.

885'

FT. FROM XX (W) LINE.

NW NW

1/4 - 1/4 SEC. 6

1243'

TWP.	RGE.	SEC.	OPERATOR	TWP.	RGE.	SEC.	OPERATOR
16S	25E	6	ARCO OIL & GAS COMPANY				

FILE NOTATIONS

Entered in NID File ..✓.....	Checked by Chief .....
Location Map Pinned .....	Approval Letter .....
Card Indexed ..✓.....	Disapproval Letter .....

COMPLETION DATA:

Date Well Completed .....	Location Inspected .....
..... WW..... TA.....	Bond released
..... OS..... PA.....	State or Fee Land .....

LOGS FILED

Driller's Log.....

Electric Logs (No.) .....

E..... I..... Dual I Lat..... GR-N..... Micro.....

BHC Sonic GR..... Lat..... MI-L..... Sonic.....

CELog..... CCLog..... Others.....

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

## APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

## 1a. TYPE OF WORK

DRILL ☒DEEPEN ☐PLUG BACK ☐

## b. TYPE OF WELL

OIL  
WELL ☐GAS  
WELL ☒

OTHER

30532

SINGLE  
ZONE ☒MULTIPLE  
ZONE ☐

## 2. NAME OF OPERATOR

ARCO Oil and Gas Company, Division of Atlantic Richfield Co.

## 3. ADDRESS OF OPERATOR

1860 Lincoln St., Suite 501, Denver, Colorado 80295

## 4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)\*

At surface

885' FWL &amp; 1193' FNL, Sec. 6-T16S-R25E

At proposed prod. zone

1243'  
885' FWL & 1193' FNL, Sec. 6-T16S-R25E

## 14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE\*

34 miles northwest of Mack, Colo.

## 15. DISTANCE FROM PROPOSED\*

LOCATION TO NEAREST  
PROPERTY OR LEASE LINE, FT.  
(Also to nearest drlg. unit line, if any)

900'

## 16. NO. OF ACRES IN LEASE

697

17. NO. OF ACRES ASSIGNED  
TO THIS WELL

320

## 18. DISTANCE FROM PROPOSED LOCATION\*

TO NEAREST WELL, DRILLING, COMPLETED,  
OR APPLIED FOR, ON THIS LEASE, FT.

--

## 19. PROPOSED DEPTH

6970'

## 20. ROTARY OR CABLE TOOLS

Rotary

## 21. ELEVATIONS (Show whether DF, RT, GR, etc.)

8464'

## 22. APPROX. DATE WORK WILL START\*

July 30, 1979

## 23.

## PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/4"	9-5/8"	36.0	350	165 sx.
8-3/4"	4-1/2"	10.5	6970	330 sx.

It is proposed to drill and complete this well as a Dakota sand gas producer, completing the well by gun perforating and fracturing through casing.

Attached are Certified Location Plat, 10 Point Drilling Program and Surface Use and Operations Plan.



IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

## 24.

SIGNED

TITLE

Operations Manager

DATE

July 20, 1979

(This space for Federal or State office use)

PERMIT NO.

APPROVAL DATE

(ORIG. SGD.) E. W. GUYNN

DISTRICT ENGINEER

APPROVED BY

TITLE

CONDITIONS OF APPROVAL, IF ANY:

DATE

SEP 14 1979

CONDITIONS OF APPROVAL ATTACHED  
TO OPERATOR'S COPY

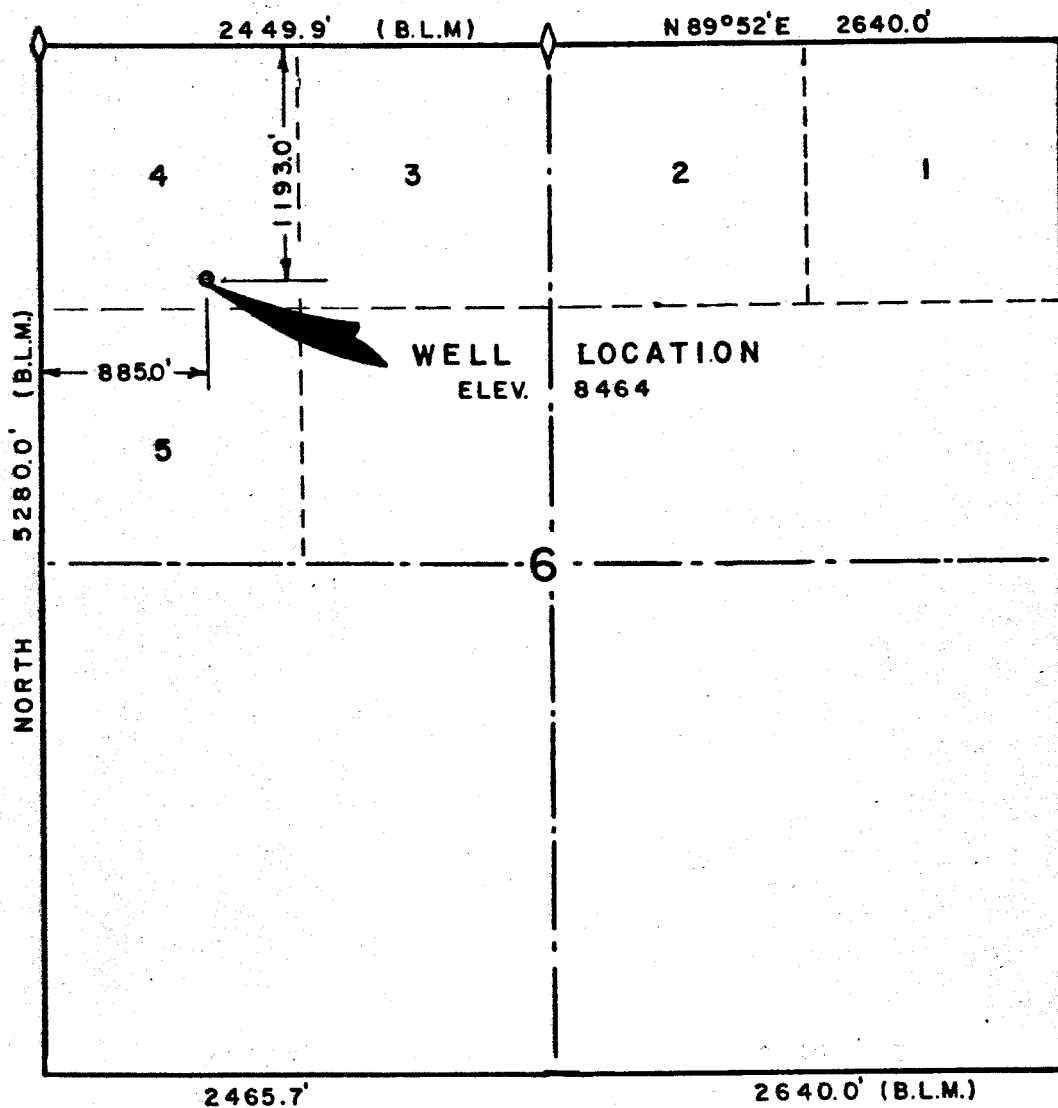
\*See Instructions On Reverse Side

NOTICE OF APPROVAL

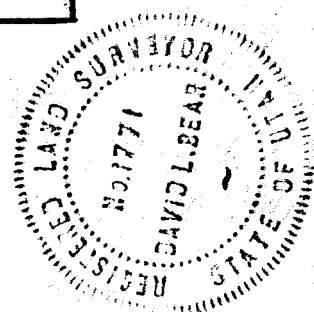
NECESSARY PLANNING OF GAS DURING  
DRILLING AND COMPLETION APPROVED  
SUBJECT TO ROYALTY (NTL-4)

Ut State O&amp;G

**WELL LOCATION**  
 1193.0 FT S.N.L. - 885.0 FT. E.W.L.  
 SECTION 6, T16 S, R 25 E, S.L.B.&M.



Scale 1" = 1000'



I, David L. Bear do hereby certify that this plot was plotted from notes of a field survey made under my direct responsibility, supervision and checking on July 18, 1979.

*David L. Bear*  
 Registered Land Surveyor

**WESTERN ENGINEERS, INC.**  
**WELL LOCATION**  
 ATLANTIC RICHFIELD CO.  
 ARCO 6-1  
 GRAND COUNTY, UTAH

SURVEYED DB. DRAWN G.L.A.  
 GRAND JUNCTION, COLO. 7/19/79

# 10 POINT DRILLING PLAN

ARCO #6-1  
NW NW Section 6-T16S-R25E  
Grand County, Utah

1. Surface Formation: Mesaverde
2. Estimated Formation Tops:

Mancos	- 2695'	Dakota Sand	- 6740'
Castlegate	- 3030'	Cedar Mtn.	- 6800'
Frontier	- 6360'	Buckhorn	- 6830'
Dakota Silt	- 6615'	Morrison	- 6920'
3. Estimated Depth of Hydrocarbon Bearing Formation: Dakota Sand - 6740'
4. Casing Program:

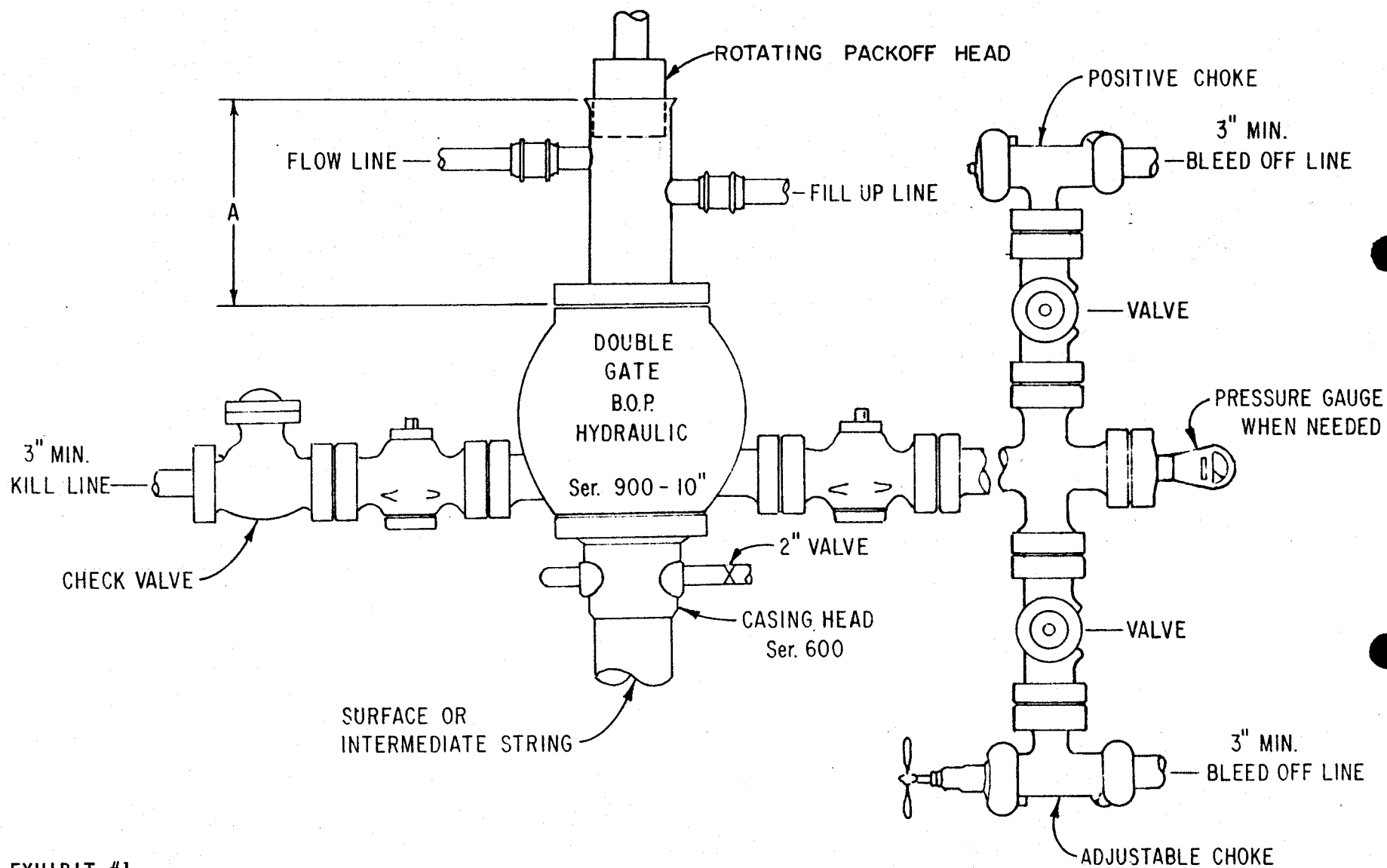
Surface casing	- 9-5/8" 36# H-40 New ST&C, set in 12-1/4" hole at approximately 350', cemented to surface with approximately 165 sx neat cmt.
Production casing	- 4-1/2" 10.5# K-55 New ST&C, set in 8-3/4" hole at T.D. of approximately 6970', cmtd with sufficient cmt to cover all hydrocarbon zones based on electric logs & caliper of hole. Estimated cmt 270 sx pozzolan cmt & 60 sx neat cmt.

Note: If large quantities of wtr are encountered while drilling with gas or air, it may be necessary to set a string of protective casing between 3000-3200' to shut off wtr so that air or gas drilling may be continued. This would be 7" 20# K-55 New ST&C cmtd with approximately 50 sx neat cmt. A 6-1/4" hole would then be drilled to T.D.
5. Pressure Control:
  - a. After surface csg is set, a double ram type blow out preventer with blind rams and pipe rams will be installed with minimum working pressure of 2000 psi.
  - b. A control choke and fill and kill lines with minimum working pressure of 2000 psi will be installed.
  - c. A rotating pack off head will be installed above the blow out preventer to control flow while drilling with air or gas.
  - d. The equipment in a. and b. will be pressure tested to 1500 psi before drilling surface pipe cmt, and the blow out preventer will be tested for operation daily and during trips.
  - e. A sketch of the proposed installation is attached (Exhibit #1).
6. Drilling Fluids:

0 - 350'	Water & gel as required to maintain hole to set surface pipe.
350 - 6970'	Air or gas.

Note: Excess gas flow or other hole problems may require use of mud during drilling. Mud materials will be maintained on location to build muds with wt 8.7-8.9#/gal, vis of 30-40 sec. API.
7. Auxillary Equipment:
  - a. A kelly cock will be used.
  - b. A float valve will be run in the drill string above the bit.
  - c. A sub with full opening valve will be kept on derrick floor to stab into the DP when kelly is not in use.

8. Logging, Coring and Testing:
- A. Logging - Open hole: Dual laterolog & CNL-FDC with caliper from T.D. to csg shoe.  
Cased hole: Cmt bond with GR in zones of interest.
  - B. No mud log or coring is anticipated.
  - C. No drill stem testing is anticipated.
  - D. Completion will be by gun perforating the 4-1/2" casing and fracing with water based fluids and proppants dn 4-1/2" csg. A smaller workover rig may be used to replace drilling rig during completion operations. After treatment, the well will be placed on production flowing through 2-3/8" OD tubing.
9. Abnormal Pressures, Temperature and Potential Hazards:
- A. No abnormal pressures or temperatures are expected.
  - B. No hazardous gas such as H<sub>2</sub>S is expected.
  - C. While drilling with gas or air, return fluids will be directed through the blow line to reserve pit at a point 125' from the well head. All open fires or ignition sources will be prohibited on location while gas or air drilling. A pilot flame will be maintained at the end of the blow line to insure burning of return gasses which are combustible.
10. Starting Date and Duration:
- |                             |   |                        |
|-----------------------------|---|------------------------|
| Start location construction | - | July 30, 1979          |
| Move in drilling rig        | - | Sept. 1, 1979          |
| Drilling time               | - | Approx. 10 days        |
| Completion time             | - | Approx. 10 days        |
| Complete operations         | - | Approx. Sept. 30, 1979 |



**EXHIBIT #1**

ARCO Oil and Gas Company  
 Blowout Control Schematic  
 ARCO #6-1

ARCO Oil and Gas Company  
ARCO #6-1  
NW NW Section 6-T16S-R25E  
Grand County, Utah

1. Existing Roads:

- A. The attached Certified Location Plat shows the location of the staked well site. Directional stakes are installed on the location for orientation.
- B. The existing access roads to the general area are shown on Exhibit #2. Primary access is via Highway 6 going west from Mack, Colorado 8.4 miles to "2 Road", then north on "2 Road" 16.2 miles to the San Arroyo Gas Treating Plant. Go past gas plant gate winding up hill 3.1 miles to Well #2 location. Bear left and go 4.2 miles to microwave keeping to right. Cross intersection and go 2.3 miles straight ahead to location.

Another access is to go west from Mack, Colorado 15.9 miles, then north 5.6 miles to "T". Turn left to fork 0.4 miles. Take right fork and go 6.5 miles to intersection past ranch with sign "East Canyon". Turn right and go 3.9 miles to fork "Polumbus" sign. Take right fork and follow main road 12.4 miles to fork. Turn left and go 1.8 miles to location.

This alternate access may be used as an alternate route especially for the rig move as there are less sharp switchback turns and grades are somewhat less than the primary route. Grades do not exceed 8% on either route. The distance from Mack to the location is 34.2 miles via the primary access and 46.5 miles via the alternate route.

- C. The access roads are color coded on Exhibit #2 and #3.
- D. Not applicable since well is development.
- E. All existing roads within one mile of the proposed location are shown in Exhibit #3. This is a development well.
- F. The existing roads are in normal passable condition and routinely heavily travelled by trucks, workers, ranchers and tourists. No changes are contemplated, but grade maintenance may be required under wet conditions.

2. Planned Access Roads: No new roads are required as location is alongside existing road.

3. Location of Existing Wells: There are no wells within one mile of this location.

4. Location of Existing and Proposed Facilities:

- A. There are no facilities owned or controlled by ARCO Oil and Gas Company within one mile of the proposed location.
- B. New proposed facilities:
  - 1. Upon completion of the well, production facilities will be installed on the well pad as shown in Exhibit #4.
  - 2. The facility will consist of a choke, gas heater, liquid knockout, oil storage tank and a gas line tie-in to the existing Mesa Pipeline gas line which runs near the location. The heater knockout, tank and well head will be spaced equally 125' from each other. Sizes of equipment will be based on well completion tests.
  - 3. All construction methods and materials will be to API specifications.
  - 4. All facilities will be housed or fenced as required to protect wildlife from harm.



C. Plans for rehabilitation of disturbed areas no longer needed for operations after construction is completed:

1. The reserve pit will be filled after it is dry.
2. Areas of the drillsite not required for operations will be contoured, covered with topsoil and reseeded as specified by B.L.M.

5. Location and Type of Water Supply:

- A. It is proposed to obtain water from the West Salt Creek drain ditch near Mack, Colorado. This location is on private land and permits, if required, will be obtained from the appropriate Colorado state authority. Other sources of water closer to the location will be investigated and notice filed of any additional source to be used.
- B. Water will be transported via truck over the primary access road described above. No new roads will be required.
- C. No water well is contemplated.

6. Source of Construction Materials: It is not anticipated that any materials for construction will be required beyond materials from cut on the location itself.

7. Methods for Handling Waste Materials:

1. Cuttings will be contained and disposed of in reserve pit.
2. Drilling fluids will be contained and disposed of in reserve pit. When drilling with air or gas, a dust arresting system will be installed on the blow line.
3. Produced fluids will be directed to steel tanks for disposal after testing.
4. Sewage - portable toilet will be provided.
5. Garbage and other trash will be placed in a trash pit, fenced and covered with small mesh wire for burning and burial after completion of work.
6. When rigs are moved out, all trash and refuse will be disposed of by burial in the trash pit or by removal from the location. All pits will be filled after drying and all areas restored as under Item #10.

8. Ancillary Facilities: No ancillary facilities are anticipated.

9. Well Site Layout:

1. Exhibit #5 shows cross sections of the location with cuts and fills.
2. & 3. Exhibit #6 shows location of mud tanks, reserve pit, trash pit, pipe racks, soil stockpiles, rig orientation, parking and access.
4. It is not expected to line pits since very little use of mud is required and liquid use amounts are expected to be small and readily evaporated.

10. Plans for Restoration of Surface:

1. Upon completion of the well, the site will be cleared of all debris, rat hole and mouse hole filled, and reserve pit and trash pit filled. Areas not needed for further operations, production, etc., will be reshaped.

2. Topsoil will be segregated during site construction and redistributed on unused areas. The area will be reseeded as directed by B.L.M.
3. Prior to rig release, pits will be fenced and maintained fenced until dry enough for filling.
4. Any oil accumulation on the reserve pit will be removed.
5. Rehabilitation will commence when drilling operations are completed about September 30, 1979 and rehabilitation is expected to be completed by November 30, 1979.

11. Other Information:

1. The site is on a small hill on the south of the existing road. Drainage is to Dry Canyon to the north and East Canyon to the south. Vegetation consists of scattered sage, live oak, conifers and some grasses.
2. The lands involved in this area are all owned by the U. S. Government. There are no other surface uses in the immediate area other than oil and gas operations.
3. Dry Canyon is the nearest surface water where intermittent water flows from rain and snow melt. Intermittent water from rain and snow melt also flows in Easy Canyon to the south. There are microwave towers about 2.3 miles to the east. There are no other occupied dwellings in the area. There are no known archeological, historical or cultural values on the site; however, an inspection will be made by an approved archaeologist before construction is commenced and this report submitted.

12. Lessee's or Operator's Representatives:

W. A. Walther, Jr.  
ARCO Oil and Gas Company  
Division of Atlantic Richfield Co.  
1860 Lincoln Street, Suite 501  
Denver, Colorado 80295  
Office: (303) 575-7031  
Res: (303) 575-7153

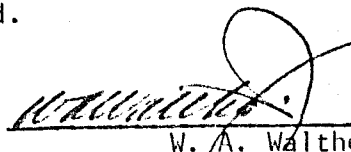
C. E. Latchem  
ARCO Oil and Gas Company  
Division of Atlantic Richfield Co.  
1860 Lincoln Street, Suite 501  
Denver, Colorado 80295  
Office: (303) 575-7127  
Res: (303) 757-1925

B. J. Sartain  
ARCO Oil and Gas Company  
Division of Atlantic Richfield Co.  
1860 Lincoln Street, Suite 501  
Denver, Colorado 80295  
Office: (303) 575-7035  
Res: (303) 770-7849

Field Representative: ARCO will have a Drilling Representative in the area at time of drilling. Contact above for name and location of this representative.

13. Certification: I hereby certify, that I, or persons under my direct supervision have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this Plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by ARCO Oil and Gas Company, Division of Atlantic Richfield Company, and its contractors and subcontractors in conformity with the Plan and the terms and conditions under which it is approved.

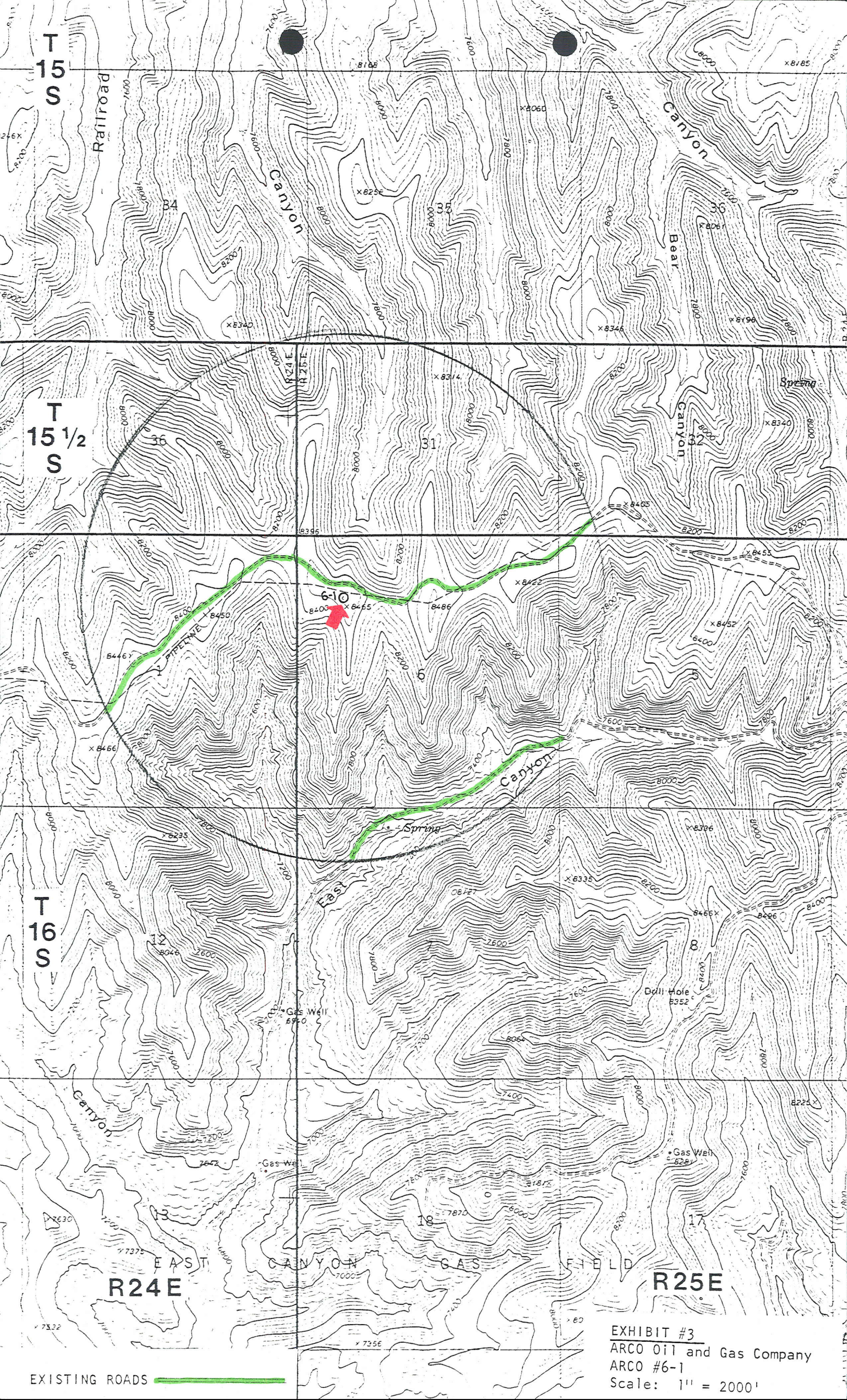
July 20, 1979  
Date

  
W. A. Walther, Jr.  
Operations Manager









T  
15  
S

Railroad

Canyon

Canyon

Bear

T  
15 1/2  
S

Spring

Canyon

Canyon

T  
16  
S

Spring

East

Dull Hole

Canyon

R24E

R25E

EXISTING ROADS

EXHIBIT #3  
ARCO Oil and Gas Company  
ARCO #6-1  
Scale: 1" = 2000'



United States Department of the Interior  
Geological Survey  
8440 Federal Building  
Salt Lake City, Utah 84138

## Usual Environmental Analysis

Lease No. U-9831  
Operator ARCO Oil and Gas Company Well No. 6-1  
Location 885' FWL 1193' FNL Sec. 6 T. 16S R. 25E  
County Grand State Utah Field San Arroyo  
Status: Surface Ownership Public Minerals Federal  
Joint Field Inspection Date August 6, 1979

## Participants and Organizations:

<u>Mark Smith</u>	<u>ARCO</u>
<u>Cory Bodman</u>	<u>Bureau of Land Management</u>
<u>John Evans</u>	<u>U. S. Geological Survey</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

## Related Environmental Analyses and References:

- (1) Book Mountain Unit Resource Analysis, Bureau of Land Management, Utah
- (2) Winter Flats Unit Resource Analysis, Bureau of Land Management, Utah

Analysis Prepared by: John T. Evans, Environmental Scientist, Grand JunctionDate August 20, 1979 NOTED JOHN T. EVANS, JR.8-21-79

12" - 500 psi gas line  
near pad  
Pad 160 x 260'  
pit 20 x 160'  
SB new access

Proposed Action:

On July 24, 1979, ARCO Oil and Gas Company filed an Application for Permit to Drill the No. 6-1 exploratory well, a 6970' gas test of the Dakota Formation; located at an elevation of 8464' in the SE/4 NW/4, Sec. 6, T16S, R25E, on Federal mineral lands and Public surface; lease No. U-9831.

There was no objection raised to the topographical setting of the proposed location. The operator was questioned as to the desirability of having drill pad construction and activity over a 12", 500 psi, gas transmission line. The operator preferred the "as staked" location. A rotation of drill pad and/or moving the location 50' south was recommended by the U. S. Geological Survey and the Bureau of Land Management representative. The pipeline is operated by Mountain Fuel for Mesa Pipeline Company, a subsidiary of ARCO.

The operator has supplied his plan for dealing with the pipeline in Sundry Notice dated August 13, 1979. The operator's plat indicates that the proposed wellsite is a minimum of 115' from well head as staked. It appears a simple rotation of drill pad would avoid fencing off portions of drill pad. This would reduce NE corner of drill pad and increase the fill in the SW corner of reserve pit. The increased fill in reserve pit could be offset by digging pits deeper. The area "lost" to operations is probably in less critical area than area proposed to be fenced off. The operator pointed out the type rig was not known and the layout is the maximum required. The surface disturbance, while "unused" in fence area would be required for wasting of cut materials.

The following alternatives are presented to the District Engineer:

- 1) Approve operations plan as amended by Sundry Notice dated August 13, 1979.
- 2) Rotate drill pad.
- 3) Move location 50' south and align drill pad with pipeline. (A move will require additional cuts and fills as topography slopes to south.)

No sur  
disturbance  
over PL  
50' - offset

The operator's lease expires September 30, 1979. Please reference unavoidable delays in processing documented in well file memo dated August 8, 1979, and BLM to USGS letter of August 9, 1979.

A rotary rig would be used for the drilling. An adequate casing and cementing program is proposed. Freshwater sands and other mineral-bearing formations would be protected. A Blowout Preventor would be used during the drilling of the well. The proposed pressure rating should be adequate. Details of the operator's NTL-6 10-Point Subsurface Plan is on file in the U.S.G.S. District Office in Salt Lake City, Utah, and the U.S.G.S. Northern Rocky Mountain Area Office in Casper, Wyoming. The 13-Point Surface Protection Plan is on file in the District Office in Salt Lake City, Utah.

12" 500 psi gas trans  
line near pad -

NOTED JOHN T. EVANS, JR.

A working agreement is pending with the Bureau of Land Management, the controlling surface agency. Rehabilitation plans would be decided upon as the well neared completion; the Surface Management Agency would be consulted for technical expertise on those arrangements.

The operator proposes to construct a drill pad 160' wide x 280' long and a reserve pit 20' x 160'. A new access road would be constructed 18' wide x 50' long from an existing and improved road. The operator proposes to construct production facilities on disturbed area of the proposed drill pad.

If production is established, plans for a gas flowline would be submitted to the appropriate agencies for approval. The anticipated starting date is August 1979 and duration of drilling activities would be about 20 days.

#### Location and Natural Setting:

The proposed location is approximately 34 miles NW of Mack, Colorado, the nearest town. A fair road runs to within 50 feet of the location. This well is in the San Arroyo Field.

#### Topography:

The proposed location is on a east-west trending ridge peak. This ridge is a surface water divide to the Colorado River on the south and the White River on the north. The ridgetop is relatively flat while dropping to north and south on the edges of the ridge.

#### Geology:

The surface geology is Mesa Verde. The soil is sandy clay and rocks derived from decomposed Mesa Verde Formation. No geologic hazards are known near the drillsite. Seismic risk for the area is minor. Anticipated geologic tops are filed with the 10-Point Subsurface Protection Plan.

Approval of the proposed action would be conditioned that adequate and sufficient electric/radioactive/density logging surveys would be made to locate and identify any potential mineral resources. Production casing and cementing would be adjusted to assure no influence of the hydrocarbon zones through the well bore on these minerals. In the event the well is abandoned, cement plugs would be placed with drilling fluid in the hole to assure protection of any mineral resources.

The potential for loss of circulation would exist and is possible in the sandstone units of the Mesa Verde. Loss of circulation may result in the lowering of the mud levels, which might permit exposed upper formations to blow out or to cause formation to slough and stick to drill pipe. A loss of circulation would result in contamination due to the introduction of drilling muds, mud chemicals, filler materials, and water deep into the permeable zone, fissures, fractures, and caverns within the formation in which fluid loss is occurring. The use of special drilling techniques, drilling muds, and lost circulation materials may be effective in controlling lost circulation.

A geologic review of the proposed action has been furnished by the Area Geologist, U. S. Geological Survey, Salt Lake City, Utah.

The operator's drilling, cementing, casing and blowout prevention programs have been reviewed by the Geological Survey engineers and determined to be adequate.

#### Soils:

No detailed soil survey has been made of the project area. The topsoils in the area range from a sandy clay to a clay type soil. The soil is subject to runoff from rainfall and has a high runoff potential and sediment production would be high. The soils are mildly to moderately alkaline and support the salt-desert shrub community. The pinyon-juniper association is also present.

Topsoil would be removed from the surface and stockpiled. The soil would be spread over the surface of disturbed areas when abandoned to aid in rehabilitation of the surface. Rehabilitation is necessary to prevent erosion and encroachment of undesired species on the disturbed areas. The operator proposes to rehabilitate the location and access roads per the recommendations of the Bureau of Land Management.

Approximately two acres of land would be stripped of vegetation. This would increase the erosional potential. Proper construction practice, construction of water bars, reseeding of slope-cut area would minimize this impact.

#### Air:

No specific data on air quality is available at the proposed location. There would be a minor increase in air pollution due to emissions from rig and support traffic engines. Particulate matter would increase due to dust from travel over unpaved dirt roads. The potential for increased air pollution due to leaks, spills, and fire would be possible.

Relatively heavy traffic would be anticipated during the drilling-operations phase, increasing dust levels and exhaust pollutants in the area. If the well was to be completed for production, traffic would be reduced substantially to a maintenance schedule with a corresponding decrease of dust levels and exhaust pollutants to minor levels. If the project results in a dry hole, all operations and impact from vehicular traffic would cease after abandonment. Due to the limited number of service vehicles and limited time span of their operation, the air quality would not be substantially reduced.

Toxic or noxious gases would not be anticipated. Operator is to control dust from drilling operations by misting or other acceptable methods.

Roads were "powder dry" and probably will require watering during rig move in if dry condition persists along pitch grades.



Precipitation:

Annual rainfall should range from about 12 to 15" at the proposed location. The majority of the numerous drainages in the surrounding area are of a non-perennial nature flowing only during early spring runoff and during extremely heavy rainstorms.

The area is in winter shutdown area. No new surface disturbance with snow on ground. Maintenance and drilling activity permitted only on existing disturbed areas. *(during winter)*

Winds are medium and gusty, occurring predominantly from west to east but vary with topography. The climate is semiarid with abundant sunshine, hot summers and cold winters with temperature variations on a daily and seasonal basis.

Surface Water Hydrology:

Drainage flows to East Canyon, a subdrainage element of the Colorado River. Proposed location is on surface water divide. Any spills leaving location would be very difficult to clean up due to topography.

Some additional erosion would be expected in the area since surface vegetation would be removed. If erosion became serious, drainage systems such as water bars and dikes would be installed to minimize the problem. The proposed project should have minor impact on the surface water systems. The potentials for pollution would be present from leaks or spills. The operator is required to report and clean up all spills or leaks.

Groundwater Hydrology:

Some minor pollution of groundwater systems would occur with the introduction of drilling fluids (filtrate) into the aquifer. This is normal and unavoidable during rotary drilling operations. The potential for communication, contamination, and commingling of formations via the well bore would be possible. The drilling program is designed to prevent this. There is need for more data on hydrologic systems in the area and the drilling of this well may provide some basic information as all shows of fresh water would be reported. Water production with the gas would require disposal of produced water per the requirements of NTL-2B. The depths of freshwater formations are listed in the 10-Point Subsurface Protection Plan. The pits would be unlined. If fresh water should be available from the well, the owner or surface agency may request completion as a water well if given approval.

Soils may be fractured and unsuitable for reserve pit construction. Operator to line pits if unstable soils are encountered.

Vegetation:

Plants in the area are of the salt-desert shrub types grading to the pinyon-juniper association.

Proposed action would remove about two acres of vegetation. Removal of vegetation would increase the erosional potential and there would be a minor decrease in the amount of vegetation available for grazing.

The operator proposes to rehabilitate the surface upon completion of operations.

Wildlife:

A Bureau of Land Management clearance on rare and endangered species is pending. The fauna of the area consists predominantly of mule deer, coyotes, rabbits, foxes, and varieties of small ground squirrels and other types of rodents and various types of reptiles. The area is used by man for the primary purpose of grazing domestic livestock and sheep. The birds of the area are raptors, finches, ground sparrows, magpies, crows, and jays.

Social-Economic Effect:

An on the ground surface archaeological reconnaissance would be required prior to approval of the proposed action. Appropriate clearances would then be obtained from the surface managing agency. If a historic artifact, an archaeological feature or site is discovered during construction operations, activity would cease until the extent, the scientific importance, and the method of mitigating the adverse effects could be determined by a qualified cultural resource specialist.

There are no occupied dwellings or other facilities of this nature in the general area. Minor distractions from aesthetics would occur over the lifetime of the project and are judged to be minor. All permanent facilities placed on the location would be painted a color to blend in with the natural environment. Present use of the area is grazing, recreation, and oil and gas activities.

Noise from the drilling operation may temporarily disturb wildlife and people in the area. Noise levels would be moderately high during drilling and completion operations. Upon completion, noise levels would be infrequent and significantly less. If the area is abandoned, noise levels should return to pre-drilling levels.

The site is not visible from any major roads. A penthouse view north and south of the general region can be enjoyed from the proposed drillsite.

The overall effect of oil and gas drilling and production activity is significant in Grand County but it is difficult to assess the environmental impact of a single well on state and/or national levels. However,

if said well was to produce in sufficient quantity, additional development wells might be anticipated. This additional development, in turn, would lead to greater environmental and socioeconomic consequences.

Should the wellsite be abandoned, surface rehabilitation would be done according to the surface agency's requirements and to USGS's satisfaction. This would involve leveling, contouring, reseeding, etc., of the location and possibly the access road. If the well should produce hydrocarbons, measures would be undertaken to protect wildlife and domestic stock from the production equipment.

Proposed location is in proposed wilderness study area. The Bureau of Land Management will determine if activity is permissible. An existing gas pipeline crosses proposed drill pad. The District Engineer would determine if adequate safety precautions have been proposed.

There are no other national, state, or local parks, forests, wildlife refuges or ranges, grasslands, monuments, trails or other formally designated recreational facilities near the proposed location.

The proposed location is within the Winter Flats Planning Unit. This Environmental Assessment Record was compiled by the Bureau of Land Management, the surface managing agency of the Federal surface in the area. The study includes additional information on the environmental impact of oil and gas operations in this area and gives land use recommendations. The E.A.R. is on file in the agency's State offices and is incorporated herein by reference.

#### Waste Disposal:

The mud and reserves pits would contain all fluids used during the drilling operations. A trash pit would be utilized for any solid wastes generated at the site and would be buried at the completion of the operations. Sewage would be handled according to State sanitary codes. For further information, see the 13-Point Surface Plan.

#### Alternatives to the Proposed Action:

1) Not Approving the Proposed Permit--The Oil and Gas Lease grants the lessee exclusive right to drill for, mine, extract, remove and dispose of all oil and gas deposits. Under leasing provisions, the Geological Survey has an obligation to allow mineral development if the environmental consequences are not too severe or irreversible. Upon rehabilitation of the site, the environmental effects of this action would be substantially mitigated, if not totally annulled. Permanent damage to the surface and subsurface would be prevented as much as possible under U.S.G.S. and other controlling agencies' supervision with rehabilitation planning reversing almost all effects. Additionally, the growing scarcity of oil and gas should be taken into consideration.

2) Approve application with modifications or stipulations as necessary to reduce the environmental impact.

- a) Operator to control dust from drilling operations (bloeie discharge) by misting or other acceptable methods.
- b) If unstable soils are encountered during construction of reserve pit, the operator would line pit. Operator responsible to ensure a tight and stable reserve pit.
- c) District Engineer to select option to approve APD as submitted, rotate pad, or move 50'.
- d) Subject to BLM stipulations and plant and animal clearance.

Adverse Environmental Effects Which Cannot Be Avoided:

Surface disturbance and removal of vegetation from approximately two acres of land surface for the lifetime of the project which would result in increased and accelerated erosional potential. Grazing would be eliminated in the disturbed areas and there would be a minor and temporary disturbance of wildlife and livestock. Minor induced air pollution due to exhaust emissions from rig engines of support traffic engines would occur. Minor increase in dust pollution would occur due to vehicular traffic associated with the operation. If the well is a gas producer, additional surface disturbance would be required to install production pipelines. The potential for fires, leaks, spills of gas, oil or water would exist. During the construction and drilling phases of the project, noise levels would increase. Potential for subsurface damage to freshwater aquifers and other geologic formations exists. Minor distractions from aesthetics during the lifetime of the project would exist. If the well is a producer, an irreplaceable and irretrievable commitment of resources would be made. Erosion from the site would eventually be carried as sediment in the Colorado River. The potential for pollution to the East Canyon would exist through leaks and spills.

If well is a producer, other development wells would be anticipated with substantially greater environmental and economic impacts.

Determination:

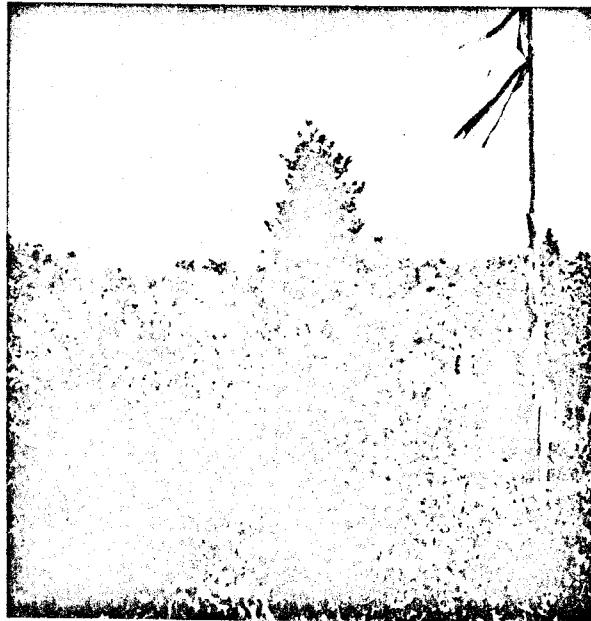
This requested action does not constitute a major Federal action significantly affecting the environment in the sense of NEPA, Sec. 102(2)(C).

Date

8/24/79

E. W. Longman  
District Engineer  
U. S. Geological Survey  
Conservation Division  
Oil and Gas Operations  
Salt Lake City District

Subject to Letter 8/24/79



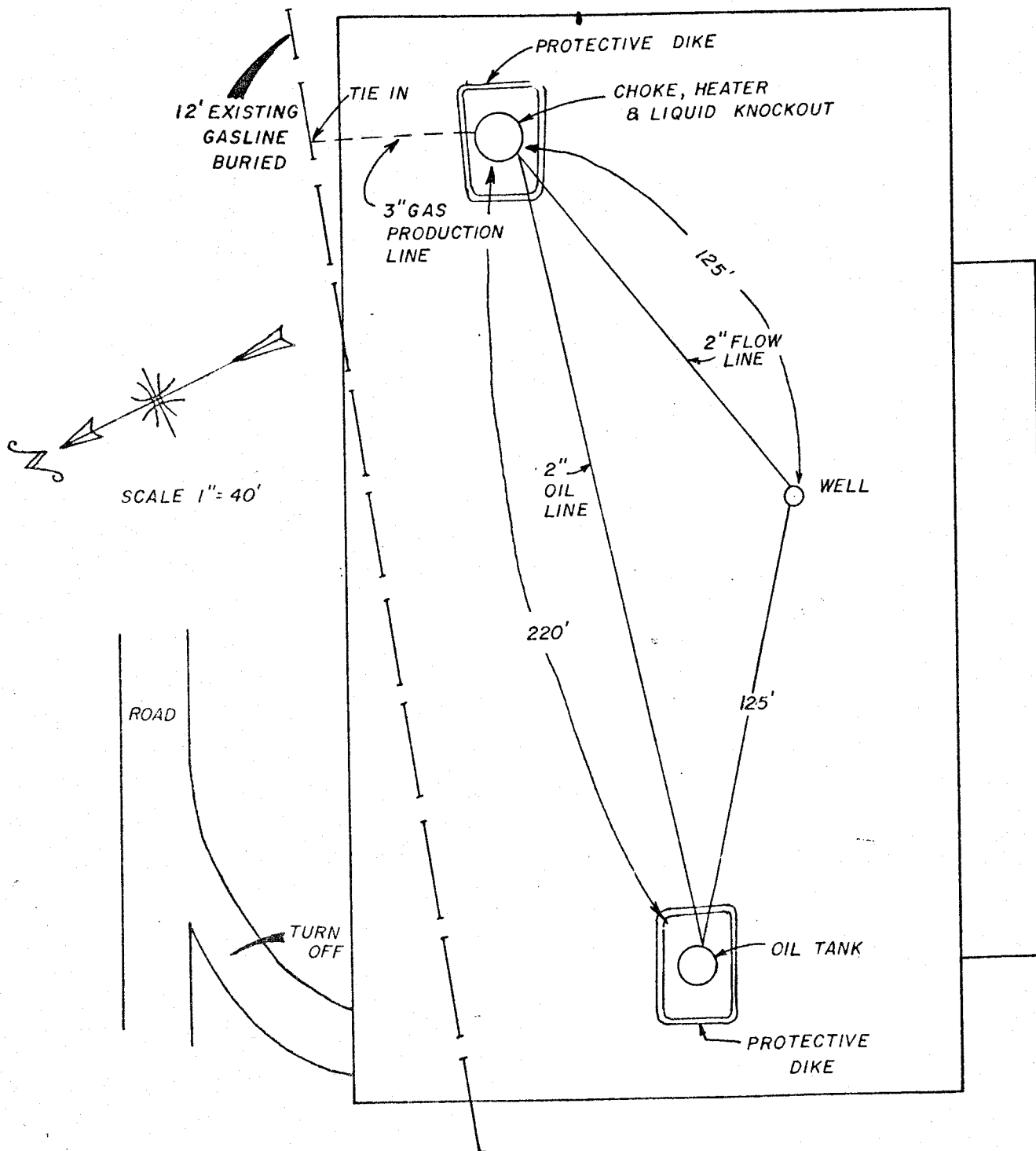


EXHIBIT #4

ARCO Oil and Gas Company  
 ARCO #6-1  
 Proposed Production Facilities

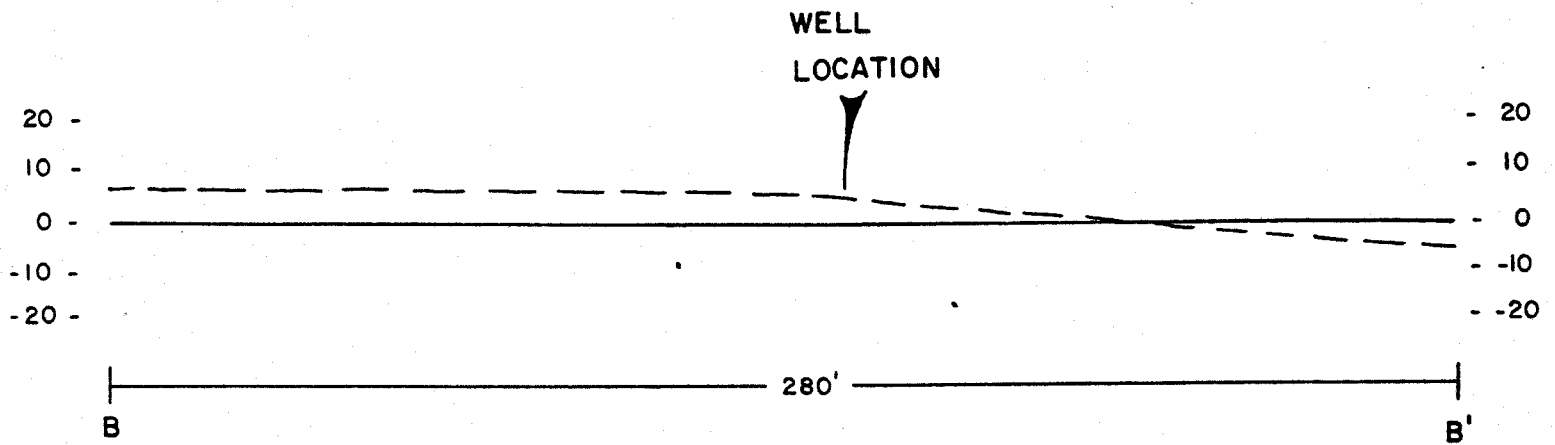
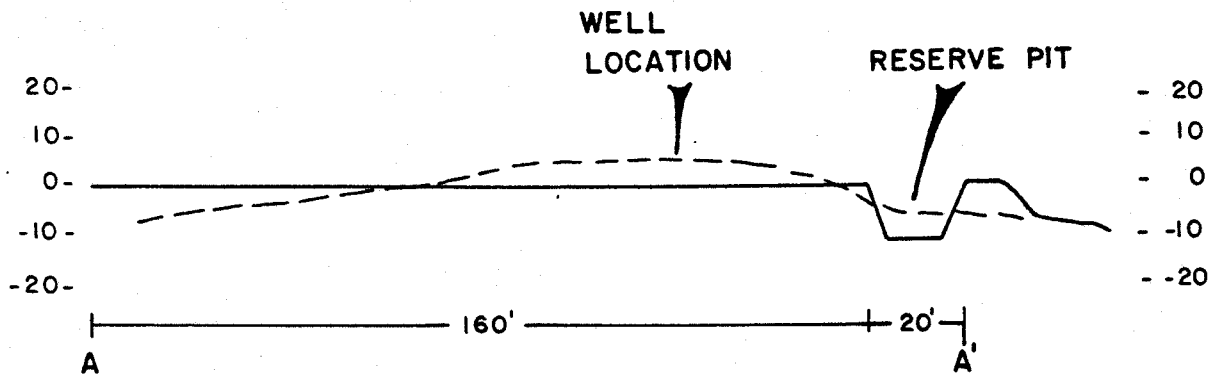


Exhibit #5

ARCO Oil and Gas Company  
 ARCO #6-1  
 Drilling Pad  
 Cross Sections  
 Scale 1" = 40'

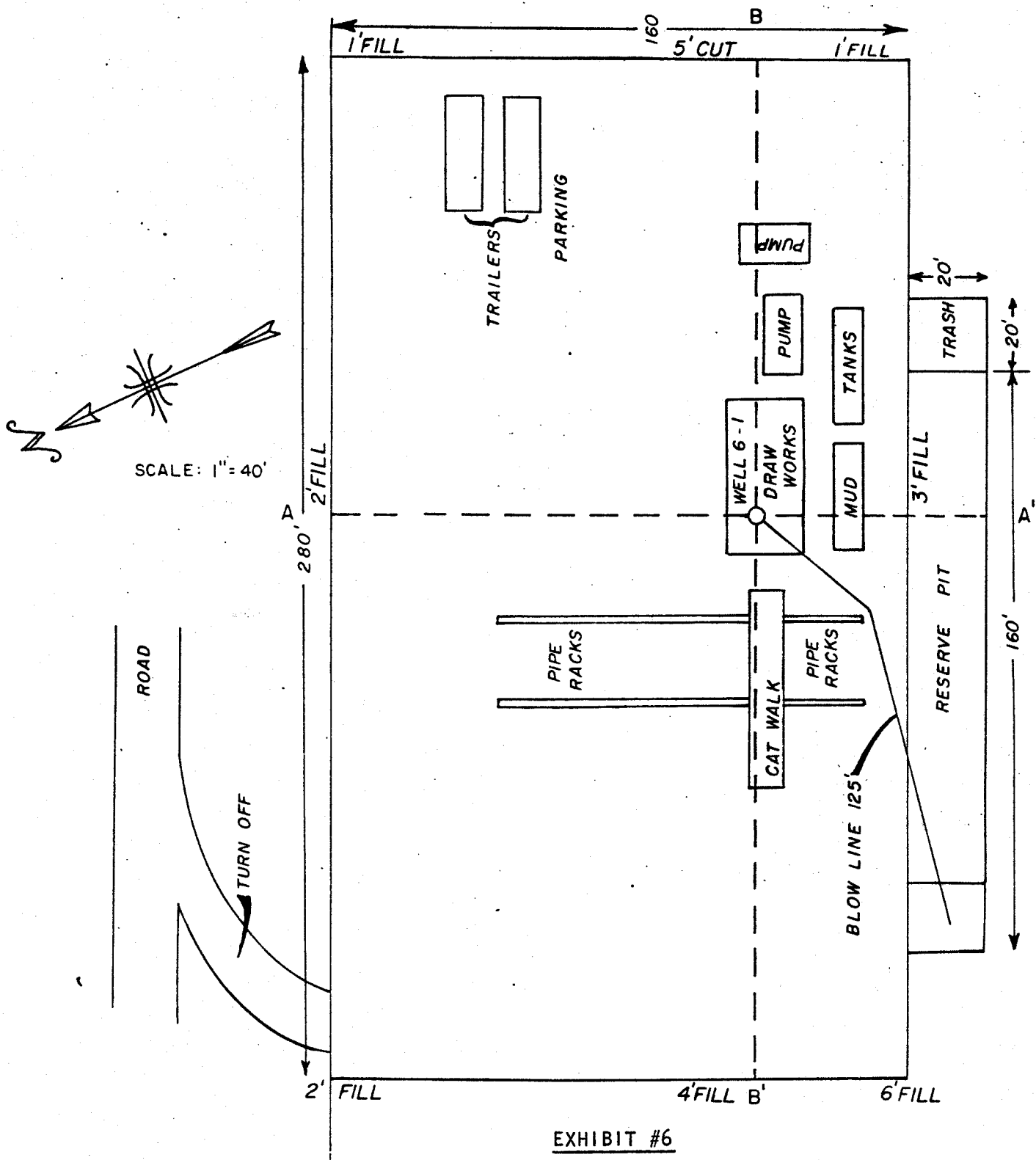


EXHIBIT #6

ARCO 6-1

1,193' FNL, 885' FWL, Sec 22 - T16S - R25E

ARCO Oil and Gas Company  
Rig Layout



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

## APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

## 1a. TYPE OF WORK

DRILL ☒DEEPEN ☐PLUG BACK ☐

## b. TYPE OF WELL

OIL  
WELL ☐GAS  
WELL ☒

OTHER

SINGLE  
ZONE ☒MULTIPLE  
ZONE ☐

## 2. NAME OF OPERATOR

ARCO Oil and Gas Company, Division of Atlantic Richfield Co.

## 3. ADDRESS OF OPERATOR

1860 Lincoln St., Suite 501, Denver, Colorado 80295

## 4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)\*

At surface

885' FWL &amp; 1193' FNL, Sec. 6-T16S-R25E NW NW

At proposed prod. zone

885' FWL &amp; 1193' FNL, Sec. 6-T16S-R25E

## 14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE\*

34 miles northwest of Mack, Colo.

## 15. DISTANCE FROM PROPOSED\*

LOCATION TO NEAREST  
PROPERTY OR LEASE LINE, FT.  
(Also to nearest drlg. unit line, if any)

900'

## 18. DISTANCE FROM PROPOSED LOCATION\*

TO NEAREST WELL, DRILLING, COMPLETED,  
OR APPLIED FOR, ON THIS LEASE, FT.

--

## 16. NO. OF ACRES IN LEASE

697

## 19. PROPOSED DEPTH

6970'

17. NO. OF ACRES ASSIGNED  
TO THIS WELL

320

## 20. ROTARY OR CABLE TOOLS

Rotary

## 21. ELEVATIONS (Show whether DF, RT, GR, etc.)

8464'

## 22. APPROX. DATE WORK WILL START\*

July 30, 1979

## 23.

## PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/4"	9-5/8"	36.0	350	165 sx.
8-3/4"	4-1/2"	10.5	6970	330 sx.

It is proposed to drill and complete this well as a Dakota sand gas producer, completing the well by gun perforating and fracturing through casing.

Attached are Certified Location Plat, 10 Point Drilling Program and Surface Use and Operations Plan.



IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM. If program is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

## 24.

SIGNED

TITLE

Operations Manager

DATE

July 20, 1979

(This space for Federal or State office use)

PERMIT NO.

APPROVAL DATE

APPROVED BY

TITLE

DATE

CONDITIONS OF APPROVAL, IF ANY:

STATE OF UTAH  
DIVISION OF OIL, GAS, AND MINING

\*\* FILE NOTATIONS \*\*

Date: July 30, 1979

Operator: Arco Oil & Gas Company (Div. of Atlantic Richfield)

Well No: Arco 6-1

Location: Sec. 6 T. 16S R. 25E County: Grand

File Prepared: ☒

Entered on N.I.D.: ☒

Card Indexed: ☒

Completion Sheet: ☒

✓ APT Number: 43-019-30532

CHECKED BY:

Administrative Assistant: \_\_\_\_\_

Remarks:

Petroleum Engineer: M. J. Minder 8-3-79

Remarks:

Director: [Signature]

Remarks:

INCLUDE WITHIN APPROVAL LETTER:

Bond Required: ☐

Survey Plat Required: ☐

Order No. 149-3 3/14/73

Surface Casing Change ☐  
to \_\_\_\_\_

Rule C-3(c), Topographic exception/company owns or controls acreage  
within a 660' radius of proposed site ☐

O.K. Rule C-3 ☐

O.K. In \_\_\_\_\_ Unit

Other:

☐ Letter Written/Approved

: DISTRICT ENGINEER, O&G, **UTAH** LAKE CITY, UTAH  
JECT: APD-MINERAL EVALUATION REPORT

LEASE NO. **U-9831**

RATOR: Arco Oil and Gas Co, Division of Atlantic Richfield WELL NO. 6-1

ATION: 1/4 NW 1/4 NW 1/4 sec. 6, T. 16S, R. 25E, SLPM

Grand County, Utah

Stratigraphy:	Green River - surface	Datum
Wasatch	964	+7500
Mesaverde	1614	+6850
Mancos	3264	+5200
Castlegate	3589	+4875
Dakota	7264	+1200
Cedar Mtn	7464	+1000
Buckhorn	7504	+960
Morrison	7564	+900

Fresh Water: No water wells in area. Approx. 10 miles to the south, fresh water has been reported from the Castlegate Ss. In this test fresh water will probably be present to the top of the Mancos.

Leasable Minerals:

Valuable prospectively for coal in the Nesten Formation of the Mesaverde Group. The four coal zones should be in the interval 2900-3250'.

Additional Logs Needed: None

Potential Geologic Hazards: None Anticipated.

References and Remarks: USGS Bull 852

Map I 736

U.S.G.S. files. SLC, Utah

1 mile North of San Arroyo KGS.

Signature: J Paul Matthey Date: 7 - 30 - 79

U.S. GEOLOGICAL SURVEY  
OIL AND GAS OPERATIONS  
RECEIVED  
JUL 31 1979  
SALT LAKE CITY, UTAH

SCOTT M. MATHESON  
Governor

GORDON E. HARMSTON  
Executive Director,  
NATURAL RESOURCES

CLEON B. FEIGHT  
Director



STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS, AND MINING  
1588 West North Temple  
Salt Lake City, Utah 84116  
(801) 533-5771

OIL, GAS, AND MINING BOARD

CHARLES R. HENDERSON  
Chairman

JOHN L. BELL  
C. RAY JUVELIN  
THADIS W. BOX  
CONSTANCE K. LUNDBERG  
EDWARD T. BECK  
E. STEELE McINTYRE

August 6, 1979

Arco Oil and Gas Company  
Division of Atlantic Richfield  
1860 Lincoln St., Suite 501  
Denver, CO 80295

Re: Arco 6-1  
Sec. 6, T. 16S., R. 25E.  
Grand County

Dear Sir:

Insofar as this office is concerned, approval to drill the above referred to well is hereby granted in accordance with the Order issued in Cause No. 149-3 dated March 14, 1973.

Should you determine that it will be necessary to plug and abandon this well, you are hereby requested to immediately notify the following:

MICHAEL T. MINDER - Geological Engineer  
HOME: 876-3001  
OFFICE: 533-5771

Enclosed please find Form OGC-8-X, which is to be completed whether or not water sands (aquifers) are encountered during drilling. Your cooperation in completing this form will be appreciated.

Further, it is requested that this Division be notified within 24 hours after drilling operations commence, and that the drilling contractor and rig number be identified.

The API number assigned to this well is 43-019-30532.

Sincerely,

DIVISION OF OIL, GAS AND MINING

MICHAEL T. MINDER  
GEOLOGICAL ENGINEER

MTM/tlh



# United States Department of the Interior

GEOLOGICAL SURVEY  
Conservation Division  
8440 Federal Building  
Salt Lake City, Utah 84138

August 24, 1979

Mr. W. A. Walther, Jr.  
Operations Manager  
ARCO Oil and Gas Company  
Division of Atlantic Richfield Company  
1860 Lincoln Street, Suite 501  
Denver, Colorado 80295

Re: Application for Permit to Drill  
Well No. 6-1  
Sec. 6, T. 16S, R. 25E  
Grand County, Utah  
Lease No. U-9831

Dear Mr. Walther:

Your Sundry Notice dated August 13, 1979 proposes a Revision of Surface Use Plan for the referenced well. Your revision shows a portion of the drill pad overlaying a 12" 500' psi OP gas line by 40' or 50' in the NW $\frac{1}{4}$  of the pad. This overlap places a small area of the disturbed area for the proposed drill pad over the pipeline route; however, it would be preferred to avoid any surface disturbance over the gas pipeline.

Accordingly, approval of this Application for Permit to Drill is conditioned that the drill pad as proposed, be rotated counter-clock-wise to parallel the pipeline and moved southwesterly 50 feet. The only surface disturbance permitted over the pipeline route is the 30' wide fill across the pipeline route for your access. The proposed staking and fencing would also apply.

Sincerely,

E. W. Guynn  
District Engineer

Supplement to EA # 474-79

March 3, 1980

Arco Oil and Gas Co.  
Division of Atlantic Richfield  
1860 Lincoln St.  
Suite 501  
Denver, Colorado 80295

RE: Well No. Arco 6-1  
Sec. 6, T. 16S, R. 25E.  
Grand County, Utah

Gentlemen:

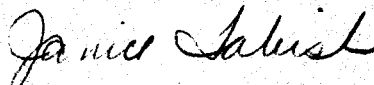
In reference to above mentioned well, considerable time has gone by since approval was obtained from this office.

This office has not received any notification of spudding. If you do not intend to drill this well, please notify this Division. If spudding or any other activity has taken place, please send necessary forms. If we do not hear from your company within fifteen(15) days, we will assume you do not intend to drill this well and action will be taken to terminate the application. If you plan on drilling this location at a later date, please notify as such.

Your prompt attention to the above will be greatly appreciated.

Very truly yours,

DIVISION OF OIL, GAS, AND MINING

  
JANICE TABISH  
CLERK TYPIST

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Form Approved.  
Budget Bureau No. 42-R1424

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR ARCO Oil and Gas Company,  
Division of Atlantic Richfield Company

3. ADDRESS OF OPERATOR  
P. O. Box 5540, Denver, Colo. 80217

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)

AT SURFACE: 885' FWL & 1193' FNL, Sec. 6

AT TOP PROD. INTERVAL: Appx. same

AT TOTAL DEPTH: Appx. same

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:

TEST WATER SHUT-OFF ☐

FRACTURE TREAT ☐

SHOOT OR ACIDIZE ☐

REPAIR WELL ☐

PULL OR ALTER CASING ☐

MULTIPLE COMPLETE ☐

CHANGE ZONES ☐

ABANDON\* ☐

(other) Withdraw Application to Drill

SUBSEQUENT REPORT OF:

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)\*

ARCO Oil and Gas Company, Division of Atlantic Richfield Company, hereby withdraws its application to drill the captioned well. The acreage has been farmed-out to Texas Oil & Gas Corporation who recently completed a well in this section.

Subsurface Safety Valve: Manu. and Type \_\_\_\_\_

18. I hereby certify that the foregoing is true and correct

SIGNED W. A. Walther, Jr. TITLE Oprns. Mgr. DATE March 10 1980

(This space for Federal or State office use)

APPROVED BY \_\_\_\_\_ TITLE \_\_\_\_\_ DATE \_\_\_\_\_  
CONDITIONS OF APPROVAL, IF ANY: